

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* CLAUDIO DE LA PRIETA,  
GERHARD HOETZEL,  
CARMEN SCHMIEDEL,  
PETRA KITIRATSCHKY,  
THOMAS SCHULTE,  
and  
HANS-DIETER WIEMHOEFER

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Appeal No. 2002-0258  
Application No. 09/254,402

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ON BRIEF

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Before KIMLIN, TIMM, and MOORE, *Administrative Patent Judges*.  
MOORE, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 11-20. Claims 1-10 have been canceled. Thus, only claims 11-20 are before us on appeal.

REPRESENTATIVE CLAIM

Claim 11, 12, and 18 are representative of the claims on appeal. They read as follows:

11. A measuring arrangement for analyzing gas components in a gas mixture, comprising:

at least one electrochemical solid electrolytic test cell including at least one cathode;

a selective oxygen-ion-conductive layer covering the at least one cathode and including a mixed-conductive ceramic material, the selective oxygen-ion-conductive layer being exposed to the gas mixture and being configured to conduct oxygen therethrough only in the form of oxygen ions; and

an electrically nonconductive layer separating the at least one cathode from the selective oxygen-ion-conductive layer, the electrically nonconductive layer including particular portions which are permeable to gas, the gas-permeable portions being configured to conduct the oxygen conducted through the selective oxygen-ion-conductive layer to the cathode;

wherein the cathode is separated from the gas mixture by the selective oxygen-ion-conductive layer and the electrically nonconductive layer.

12. The measuring arrangement according to claim 11, further comprising:

at least one further cathode, wherein the at least one cathode is situated in a diffusion channel between an opening of the diffusion channel and the at least one further cathode.

18. The measuring arrangement according to claim 12, wherein the diffusion channel is a tunnel structure composed of heat-resistant glass.

#### The References

In rejecting the claims under 35 U.S.C. § 103(a), the examiner relies upon the following references:

Nakazawa et al. (Nakazawa)	5,178,744	Jan. 12, 1993
Garzon et al. (Garzon)	5,543,025	Aug. 06, 1996
Liu et al. (Liu)	5,667,652	Sep. 16, 1997
Dietz et al. (Dietz)	5,879,526	Mar. 09, 1999

(filed Mar. 24, 1997)

The Rejections

Claims 11, 13-17, 19, and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu in view of Garzon.

Claim 12 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Liu in view of Garzon and Dietz.

Claim 18 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Liu in view of Garzon, Dietz, and Nakazawa.

The Invention

The invention relates to a measuring arrangement for analyzing gas components in gas mixtures, such as exhaust gas components of internal combustion engines. The arrangement includes at least one electrochemical solid electrolytic test cell having at least one cathode. A selective oxygen-ion-conductive layer covers the cathode and includes a mixed-conductive local ceramic material. An electrically nonconductive layer separates the cathode from the selective oxygen-ion-conductive layer. The electrically nonconductive layer contains gas-permeable portions which conduct the oxygen to the cathode. (Appeal Brief, page 2, lines 13 - 27). Other details are discernable from reproduced claim 1, above.

I. The Rejection of Claims 11, 13-17, 19, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Liu in view of Garzon

The examiner has found that Liu discloses a solid electrolyte sensor having a cathode separated from a porous diffusion barrier having a diffusion pinhole by an insulating layer. (Examiner's Answer, page 3, lines 13-16). The examiner has additionally found that Garzon discloses that a mixed ion conductor is well-known to be used for separating oxygen from other gas components (Examiner's Answer, page 3, lines 21-22).

The examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a mixed ion conductor as the diffusion layer barrier because Garzon teaches the mixed ion conductor diffuses oxygen slowly and improves sensor performance (Examiner's Answer, page 4, lines 4-8).

The appellants, on the other hand, assert that Claim 11 recites that the cathode is separated from the gas mixture by the selective oxygen-ion-conductive layer and the electrically nonconductive layer; while Liu is said to teach direct gas contact with the electrode, and the art generally fails to teach the claimed arrangement of layers. (Appeal Brief, page 7, lines 17-21).

We find that Liu teaches a standard porous diffusion barrier with a pinhole through which exhaust gases diffuse into a chamber above the electrode (Column 7, lines 29-41). We find that Garzon teaches the use of a diffusion of oxygen through a mixed conducting layer which provides improved sensor performance vis-a-vis aperture diffusion (column 2, lines 59-66). Accordingly, we agree with the examiner that one of ordinary skill in the art at the time the invention was made would have been motivated to exchange pinholed porous layer 126 with a mixed conducting layer as taught by Garzon.

We note that the examiner terms reference numeral 138 of Liu as an insulating layer. We find that reference numeral 138 is a ceramic spacer (column 7, lines 38-39) which defines a gas compartment. While the spacer may be electrically insulating, the defined compartment (and the electrode) is separated from the exhaust gas only by a diffusion barrier 126 with a diffusion aperture 128 (or, if substituted by Garzon, only by the mixed conducting layer) allowing direct passage of exhaust gas by diffusion through the aperture, or oxygen by transport through the layer.

In contradistinction to the cited reference, in the claim two layers<sup>1</sup> are required to separate the exhaust gas from the electrode - the insulating layer and the selective oxygen-ion-conductive layer. The selective layer conducts only oxygen in the form of oxygen ions, and the non-conductive layer has gas permeable portions to conduct the oxygen. Liu, on the other hand, allows direct gaseous contact of the diffused exhaust gas, or oxygen as modified, to a chamber above the electrode. The appellants have added an additional layer into the chamber.

The secondary reference relied upon teaches the preference for an oxygen conductor of a mixed ion conductive material. However, this secondary reference does not cure the deficiency of the primary reference - which creates an exhaust gas or oxygen chamber in direct contact with the electrode, which is not covered by the insulating layer.

As the examiner has not identified where in the reference the claim limitation of the insulating layer covering the electrode is found, a prima facie case of obviousness has not been established. We are, therefore, constrained to reverse this rejection.

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<sup>1</sup> Webster's New Collegiate Dictionary defines layer as: **2a** : one thickness, course, or fold, laid or lying over or under another **b** : stratum. We thus interpret claim 11 as requiring a layer to be present over the entire cathode.

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II. The Rejection of Claim 12 under 35 U.S.C. §103(a) as being unpatentable over Liu in view of Garzon and Dietz

The examiner has found that Dietz discloses a solid electrolyte sensor having two cathodes disposed sequentially along a diffusion channel. (Examiner's Answer, page 4, lines 13-15). The examiner thus concludes that it would have been obvious to one of ordinary skill in the art to provide a second electrode along a diffusion channel to enable the sensor to measure oxygen at the first cathode and another gas at the second cathode (Examiner's Answer, page 4, lines 17-20).

This secondary reference fails to disclose the claimed layer arrangement as discussed with respect to claim 11. Consequently, we are constrained to reverse this rejection as well.

III. The Rejection of Claim 18 under 35 U.S.C. §103(a) as being unpatentable over Liu in view of Garzon, Dietz, and Nakazawa

The examiner has found that Nakazawa discloses a diffusion channel made of glass. (Examiner's Answer, page 5, lines 1-2). This secondary reference also fails to disclose the claimed layer arrangement as discussed with respect to claim 11. Consequently, we are constrained to reverse this rejection as well.

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Summary of Decision

The rejection of claims 11, 13-17, 19, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Liu in view of Garzon is reversed.

The rejection of claim 12 under 35 U.S.C. §103(a) as being unpatentable over Liu in view of Garzon and Dietz is reversed.

The rejection of claim 18 under 35 U.S.C. §103(a) as being unpatentable over Liu in view of Garzon, Dietz, and Nakazawa is reversed.

**REVERSED**

EDWARD C. KIMLIN	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
CATHERINE TIMM	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
JAMES T. MOORE	)	
Administrative Patent Judge	)	



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